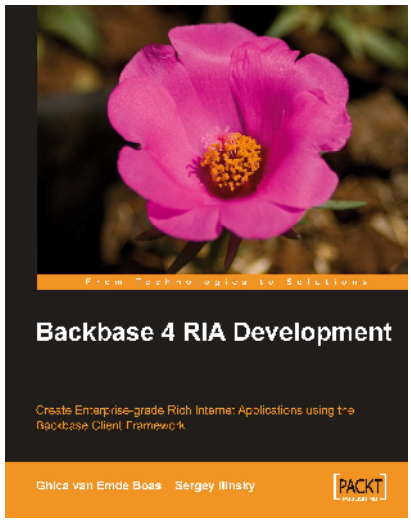
Backbase 4 RIA Development

Ghica van Emde Boas
Sergey Ilinsky



Chapter No. 2
"User Interface Development"

In this package, you will find:

A Biography of the authors of the book

A preview chapter from the book, Chapter NO.2 "User Interface Development"

A synopsis of the book's content

Information on where to buy this book

About the Authors

Ghica van Emde Boas is an independent IT Consultant. She was employed by IBM in the Netherlands for 30 years as a relational database developer, as an IT Architect, and as a Java developer involved with the largest Java framework ever written—the IBM SanFrancisco Framework. She has been taking part in the development of object-oriented methodologies within IBM. She has been teaching these at IBM's Object Technology University in Belgium and the USA.

Ghica has co-organized several workshops on Generative Model Transformations at OOPSLA (Object-oriented Programming, Systems, Languages, and Applications) conferences, the place where it all happened: objects, design patterns, modeling wars (UML), eXtreme programming, and Agile development. She now specializes in PHP, MySQL, and web application development. She helped write the client framework documentation for Backbase.

Ghica has written two books in Dutch about PHP and MySQL for Pearson Education, and has contributed considerably to the Dutch translation of "*Foundations of Ajax", by Ryan Asleson and Nathaniel T. Schutta, Apress*. While at IBM, Ghica participated in writing two Redbooks and published two articles, one in the IBM Journal of Research and Development and the other in the IBM Systems Journal.

Ghica lives and works in the Netherlands. She is married and has three children. She likes rowing on the Spaarne River.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

First of all, I would like to thank Dimitra Retsina, Jouk Pleiter, and Gerbert Kaandorp from Backbase for their enthusiasm about this book-writing project and for supporting me by allowing access to all information about the Backbase framework that I needed.

Sergey Ilinsky deserves my gratitude for his spontaneous offer to be a co-author and for the fierce discussions we had, which were always interesting.

Without the help of the R&D crew at Backbase, this book would contain a lot more errors and fewer examples. Thanks!

The Planning & Scores group at the ROC Eindhoven (a very large school in the Netherlands) helped me by developing widgets that I could use in the sample application, while Geert Broekmans wrote the PHP database framework used in the sample application of the book.

I am truly grateful for the help and useful comments from the reviewers and the staff at Packt Publishing.

Of course writing this book would not have been possible without the ongoing support for my information technology related adventures, from my husband, Peter.

Sergey Ilinsky is a senior UI engineer at Nedstat BV and a Tech Lead for an open source project at Clientside OY. He has worked for Backbase for three years, evangelizing open-standards based software development, while engineering and developing core parts of the Backbase Client Framework.

Having been heavily involved with client-side development since 2003, he became an expert in many standard and proprietary web technologies. He is also a contributor to some of the modern web-related specifications. Sergey can frequently be found on AJAX or client-side technology related forums, or he can be met at international developers' conferences where he occasionally gives talks.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

I would like to thank Backbase for the opportunity they gave me to work and improve on this beautiful piece of software—the Backbase Ajax Client Framework—and later for letting me join the project of writing this book.

Thanks to Ghica van Emde Boas, the main writer of the book, who I had the pleasure to work with and who never sent me a third email reminder whenever I delayed my part.

Thanks to the staff of Packt Publishing involved in this book project.

I would like to express special gratitude to my girlfriend, Elena O., for her tolerance and ongoing support.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

Backbase 4 RIA Development

This book is about squaring the circles of web applications. It deals with the *Backbase Client Framework.*

Before you put this book away because you think that squaring circles is rather vague and mathematically impossible, let's hasten to say that this book will give you a solid foundation in web application programming using the Backbase Client Framework.

Now, before you again think of putting this book away because you are not sure why you should use the Backbase framework instead of one of the many other JavaScript frameworks or libraries out there, give us a chance to briefly explain what squaring the circles of web applications means and what the Backbase framework has to do with this.

Here is a set of rhetorical questions: Would it not be nice if you have an extensive library of UI widgets that could be used in the same way as HTML? If you could extend HTML with new widgets and components in any way you like? If you could use AJAX almost transparently? If you could bind data retrieved dynamically from a server in flexible ways to any widget, in particular to complex data grids?

Of course, that would be nice for a number of reasons. First of all, XML-based UI definition languages such as HTML have been proven to be a very effective and natural way to lay out web pages. UI designers are familiar with them and have good tools to help them make good designs.

Therefore, the UI designer or the developer who plays this role should be able to define the UI using an XML-based UI definition language directly. It should not be necessary to generate the HTML or UI definition in complex ways using a server scripting language such as PHP or JSP; even worse is constructing the DOM tree to define the UI using JavaScript. This is because it is very hard to predict what the final result on the web page will be from the perspective of the UI designer. Yet, this is a common practice today.

Rich UI widgets will have rich interaction with each other and with a server. For example, to retrieve new data dynamically from a database to be displayed in a table, a drop-down list, or a report, and so on. Common interaction patters involve also submitting form data that can be used for updates on a server.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

Creating rich interaction is a programmer's job. On the client side, you will want to use JavaScript and on the server side, you have a choice of options according to your preference or that of your developers. The question is how do you prevent polluting your nice, clean, square-bracketed XML-based UI definition language with the round JavaScript objects that you need to implement the desired behavior?

The answer is the Backbase Client Framework. For details of how this happens and how you really square the circles, we refer to the rest of this book. But let's briefly introduce the framework here: the Backbase Client Framework is a standards-based, server independent, cross-browser framework to create Rich Internet Applications (RIAs).

RIA development is usually associated with either Adobe Flex or Microsoft Silverlight. Although both have similar XML-based UI definition languages, the main difference with the Backbase framework is that they need a plugin to run, whereas the Backbase framework does not because it is developed in JavaScript.

Backbase allows the development of web applications that run within all major browsers, whereas developers are able to use established standards for XHTML, DOM, CSS, XPath, and XSLT, even if the browser used does not support them. The transparent use of AJAX technologies, for example to submit forms or to retrieve updates for data grids, can be taken for granted with the Backbase framework.

This book teaches you how to use the Backbase framework effectively from *Hello Backbase* to complex custom-defined UI components. The book contains a complete overview of all UI libraries available within the Backbase framework and shows examples for each element described. It teaches you how to develop your own widgets, providing a comprehensive overview of the Backbase Tag Definition Language (TDL) and by showing interesting, non-trivial examples.

Significant attention is given to the architectural aspects of designing a web application, showing sample applications using a Model-View-Controller approach.

What This Book Covers

Here is a summary of the chapter contents:

Chapter 1: *Hello Backbase!*, walks you through the steps to set up your development environment.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

The famous *Hello World* is shown in many variations: with only basic JavaScript, a Backbase UI widget together with basic JavaScript, a Backbase Tag Library widget together with the Backbase XML Execution Language, and finally using AJAX communication with a server script.

This chapter teaches you something about XML namespaces.

Chapter 2: *User Interface Development*, provides a closer look at the Backbase UI markup languages and their XML namespaces. We give an overview of the Backbase Tag Library (BTL) and details about the UI layout widgets in BTL.

The proper layout of an application user interface involves styling with CSS. We describe how CSS can interact with the BTL widgets and how you can go about styling in your web application.

Chapter 3: *Writing the Application Logic*, provides more details about the execution logic of a web application. We look at the Backbase programming model and the various APIs it provides. In particular, we look at the Backbase XML Execution Language and at the Command Functions.

We add a few new BTL widgets to our repertoire: the *Info and Notify* widgets.

Chapter 4: *Client-server Communication and Forms*, covers subjects that range from low level details about asynchronous communication between client and server, to high level web application architecture.

We show you the details of *forms* support, including validation options, in the Backbase framework and list the widgets available in this category.

We will start applying the knowledge acquired in these four chapters to design and develop a sample application for a travel blog site, the C3D sample application.

Chapter 5: *Data-bound Widgets*, deals with data binding which is an interaction between a data source, usually residing on a server (for example, a database), and a data observer is usually an object on the client that can map this data to a UI widget.

In this chapter we discuss data binding, the data-bound widgets in the Backbase framework, and how you can make your own widget.

The most powerful data-bound widget in the Backbase framework is the `dataGrid`. With 11 examples, we explore many details of using this grid.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

Chapter 6: *More Dynamic Behavior*, talks about:

Behaviors: Generic functionality that you can attach to any Backbase element.

The built-in behaviors, in particular the *drag-and-drop* behavior: how you can influence the dragging of elements and the things you can do when the element is dropped. We also discuss the *resize* behavior with its options.

Command functions to add, remove, or set behaviors dynamically.

The *broadcaster/observer* elements and functions.

Animation with the *Synchronized Multimedia Integration Language* (SMIL).

Chapter 7: *Creating UI Components*, gives a lot of detail about the *Tag Definition Language* (TDL), the most interesting and unique feature of the Backbase framework. We show that you can build powerful UI components using TDL, which promises new ways of doing web application development.

Chapter 8: *Widget Wrap-Up*, covers almost all the remaining BTL widgets and command functions. We will look in detail at *actions*, *menus*, and *windows*.

Chapter 9: *Debugging, Optimization, and Deployment*, shows that the Backbase tool set, especially the *debugger*, has an advantage over other tools because it works with all browsers. In addition, the Backbase debugger allows you to inspect your Backbase application structure and all custom built widgets easily.

Using the guidelines set forth by the **YSlow** tool, we describe what you can do to optimize a Backbase web application.

We look at deploying the Backbase framework libraries, optimizing the TDL bindings, and using the optimized versions of the bindings delivered with the Backbase package.

Chapter 10: *Framework Comparison*, is a rather theoretical chapter that will show you a way to look at the various JavaScript frameworks available and how to categorize them.

We illustrate with an example the difference in coding style for a pure JavaScript framework as opposed to the Backbase framework using XML for UI layout. We also illustrate how easy it is to integrate other frameworks into the Backbase framework.

Chapter 11: *The Square Web Application*, formulates what a *square web application* is and how to develop one.

This last chapter provides a last look at the C3D travel blog sample application. It shows changes and updates according to the *make it work, make it right, make it fast* principle. The details of uploading an image and of including a Google map are included.

We end the chapter by developing a square puzzle.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

2
User Interface Development

The Backbase Tag Library (BTL) contains about fifty UI widgets—UI components that can be embedded in an HTML page—that help you to build a web page quickly. In this chapter, we will give an overview of BTL and a list of all elements available. We will briefly describe the structure of BTL, showing the base elements from which BTL widgets inherit, depending on their function.

Widget, **element**, **control**, and **UI component** are terms that are almost synonymous and that can cause confusion. The Backbase documentation is sometimes vague about their meaning. We try to use widget for visible things on a page and element in a more generic way for things that can also be abstract or behavioral. We will avoid control, but the word is used sometimes in the Backbase documentation.

There are six BTL widgets intended to do the major work when laying out a web page. We will describe those in more detail, with examples. To make this work, we need some utility tasks, for which a special set of elements is available and we will describe those too.

With the layout widgets that we'll describe, we'll have enough knowledge to build a sample application specific for this chapter. This sample application, a BTL Exerciser, will show and execute all BTL examples that we'll show in this, and the following, chapters. The BTL Exerciser is built upon the basic layout that we showed at the end of the previous chapter.

Another topic will be styling of the web page and what you can do to make the Backbase widgets fit your style.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

You are not expected to read this chapter as if it were a novel. Depending on your skill and interest, you can glance through the pages to see what widgets are available and find out how to code them, or you can read about the object-oriented structure of the widgets and their relationships.

Here is a complete list of subjects that we will discuss in this chapter:

- Squaring the circles: why an XML-based framework
- The Backbase Reference
- An overview of the Backbase markup languages
- XHTML within Backbase
- Overview of the Backbase Tag Library (BTL)
- The BTL abstract elements
- The BTL layout widgets
- The BTL utility elements
- Styling techniques
- A sample application that can show all BTL examples

As we cannot describe all the BTL widgets in this chapter, here is a table that lists where each category can be found:

Category	Chapter
Layout	2
Info & Notify	3
Actions & Menu	8
Grids & Trees	5
Forms	4
Multimedia	8
Windows & Dialogs	8
Utilities & Tools	2

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

Squaring the circles of web applications

There is an old saying that expresses the difficulty of trying to match things that inherently do not match: "Try to fit round pegs into square holes". In IT circles, the saying became popular to describe the difficulty of storing programming objects created, for example in Java, in a relational database table. If you think about it, this is exactly what many AJAX developers try to do: fit round JavaScript objects in square HTML tags.

The Backbase framework solves this problem by allowing you to write JavaScript code that is encapsulated as data within XML tags. This causes the pieces of JavaScript that you need in your application to become smaller and easier to write. The problem of unwanted global objects interfering in unexpected ways with other parts of your application, or with other frameworks that you may want to use, is solved in this way. We will discuss the background for these ideas in Chapter 7, which is about the Backbase Tag Definition Language.

Now, our task is to explain what the squares or the XML tags look like in the Backbase framework. We'll start with the tags that allow you to build a UI: XHTML and the built-in UI widgets, the Backbase Tag Library.

The Backbase Reference

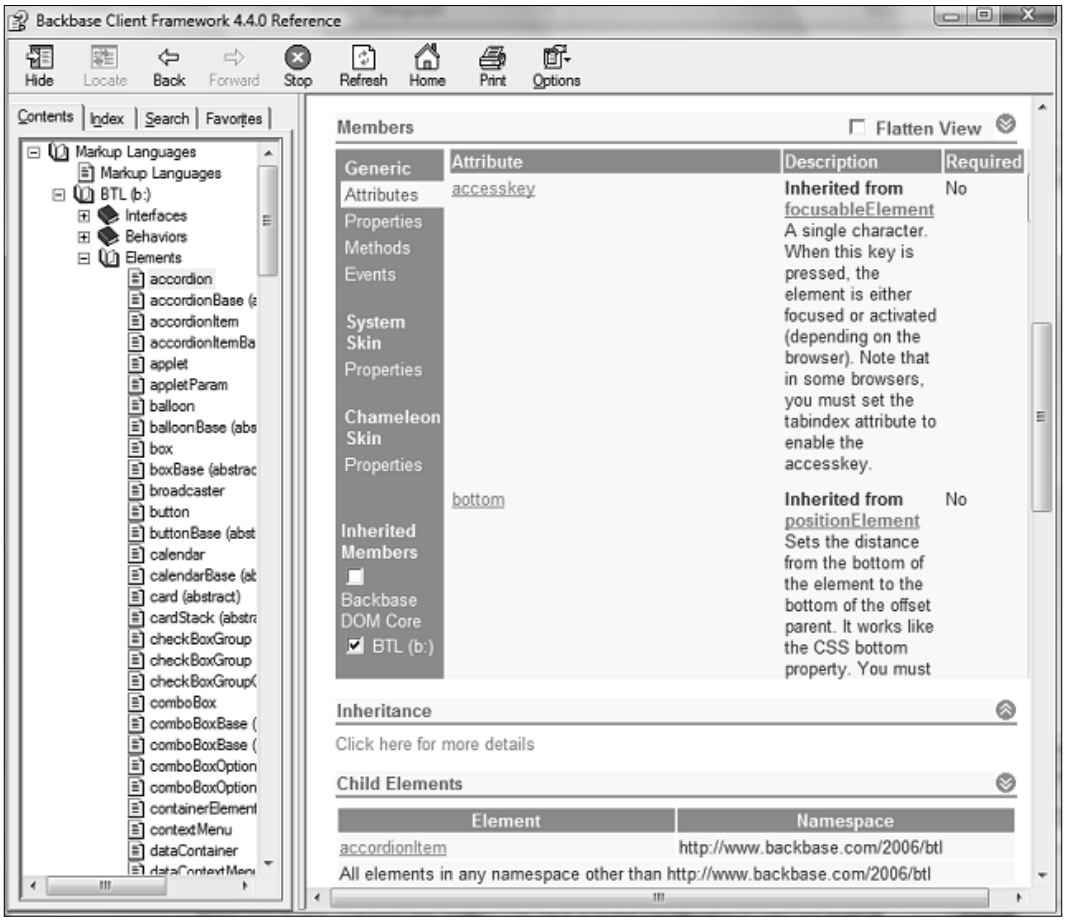
The best source of information for all details concerning the Backbase framework is the API Reference. The content of the Reference is generated from the source code of the Backbase framework. This means that the API Reference is up-to-date, but also that its format may not be clear at first. We suggest that you take your time to become familiar with the API Reference, because the amount of detail it contains can be intimidating. There are two versions of the API Reference, one in the Windows Help format and one in HTML format.

From experience, we know that you will have the API Reference open on your desktop most of the time while developing, to look up widgets or functions you are using. Although, by having this book available, the need to search the Reference will be much less.

After opening the reference, click on the **Markup Languages** book, then on **BTL (b:)**, and next on **Elements**. You will see an alphabetical list of the widgets that are available in the BTL. Click on one and you will see its attributes, properties, methods, and events. You can click on almost anything to get more details, and to see inheritance, derived elements, attributes, and events.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

Here is a typical API Reference page:



UI markup languages

As we have explained in Chapter 1, the Backbase framework implements a set of XML markup languages for the purpose of developing web applications. In this section, we will give an overview of those markup languages that are used to develop the visual part of your web application.

Believe it or not, after reading just the first chapter you will have a sound background to start developing Backbase web applications. So far, you have seen how to:

- Set up an application UI skeleton
- Specify the namespace definitions needed

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

- Put Backbase Tag Library widgets on the page
- Interact with a widget through an event handler

The key insight into understanding how to develop web applications with the Backbase framework is that you will develop XHTML documents as before, using familiar XHTML syntax and technology. In addition to what you could use before, you have a set of XML markup languages available that use their own XML namespaces. Not only can you use the languages that Backbase has developed, you can also develop your own markup language using the Tag Definition Language, as we will see in a later chapter.

For UI development, we need XHTML, forms, and BTL markup languages. Here is an overview of these:

Language	Standard	Description
Backbase Tag Library	No	The BTL (Backbase Tag Library) is a set of extensible UI widgets that shield you to a large extent from cross-browser problems and that you can use out of the box. These widgets use a declarative model familiar to anyone who knows standard HTML. Namespace: `xmlns:b = "http://www.backbase.com/2006/btl"`
Forms	No	The forms namespace contains a number of interfaces and base implementations for submission of forms and validation functionality that is shared between XHTML, BTL, and custom client controls. Namespace: `xmlns:bf = "http://www.backbase.com/2007/forms"`
XHTML	Yes	XHTML, as provided by Backbase, has methods, properties, and attributes that correspond almost exactly to XHTML 1.1 standards. For more information, refer to the W3C `http://www.w3.org/1999/xhtml`, the XHTML specification. Namespace: `xmlns = "http://www.w3.org/1999/xhtml"`

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

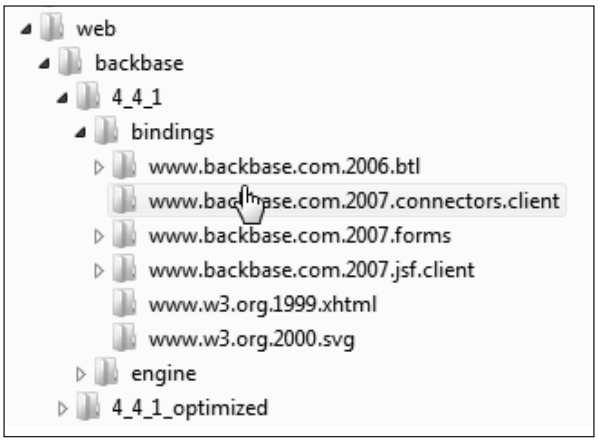
Language	Standard	Description
XInclude	Yes	XInclude is a mechanism to include other files, which facilitates the modularity of applications. For more information, refer to the W3C `http://www.w3.org/TR/XInclude`, the XInclude specification. Namespace: `xmlns:xi = "http://www.w3.org/2001/XInclude`

There are other markup languages as well, as you may have guessed from the list in Chapter 1. We will see details about these in later chapters.

Where is the source code?

The source code of the Backbase framework is available for you to view. In the package, you will find two versions of the code—a development version and an optimized version. The difference between the two is that the optimized version has all white space filtered out to minimize file size. For the same reason, the development version source code has no comments, but most of these comments can be found in the Reference.

If you open the package and then the `web` folder, you will see a structure as in the picture below (the release number may differ):

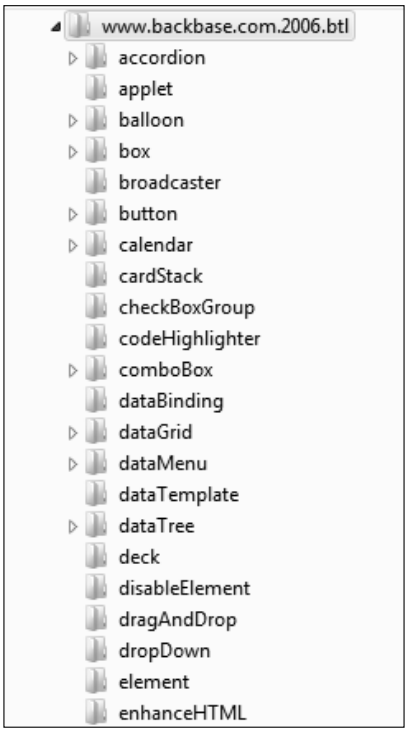


You may have guessed that the BTL definitions are in:

`web/backbase/4_4_1/bindings/www.backbase.com.2006.btl`

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

When you open this folder, you will see (we are showing only a part of the list):



There is a folder for every element in BTL. Many folders have subfolders: `chameleon` and `system`, to accommodate the two skins that the Backbase framework provides for BTL, the chameleon, and the system skin.

Widgets' definitions are loaded in a lazy manner, which means only those definitions are loaded that are actually used.

XHTML

The overview in the previous section shows XHTML as one of the markup languages that you will need for UI development. Are we kicking in an open door here? Maybe, maybe not.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

We hope you remember that all the Backbase code is contained within `script` tags with `type="application/backbase+xml"`; we called this a Backbase area. This means that a browser will not process any tags placed within this area directly. Instead, the Backbase Client Runtime will process them before being presented to the browser. This is the reason why XHTML is a markup language for the Client Runtime just like the other markup languages that it processes.

If you place a tag in a Backbase area that looks like an XHTML tag, in reality, it is a tag from the XHTML markup language implemented by Backbase. This offers some interesting possibilities: an XHTML language that complies fully with the W3C standards on all browsers, for example. There is some sugar on top of this, which adds a very important feature: AJAX support for form submission, form validation, and more.

The processing of the XHTML tags Backbase Client Runtime also has a drawback because it takes extra time. If you are not using any specific Backbase framework facility, this would just be a performance penalty. Therefore, if you have pieces of code where no Backbase markup language is involved, you should place it outside the Backbase area. You can have as many Backbase areas as you like.

As XHTML is just another markup language, you must declare its namespace while using it, which will almost always be the case. Therefore, the XHTML namespace is usually the default namespace that does not require a prefix.

We don't have to tell you what XHTML looks like because we assume that you already know it. We spend some time on it here anyway. The reason is that the Backbase Client Runtime is much less forgiving for sloppy code than most browsers are. If you see errors in your application, it is usually a good idea to check first for unclosed tags. In many cases, the Backbase debugger will give you a good indication of what is wrong.

XHTML 1.1 is in fact a refined version of HTML 4 with proper XML syntax enforced. We briefly hinted at what you should keep in mind when discussing the page skeleton. Here it is again, as a short checklist:

- Tags should be closed
- Element names as well as attribute names should be lowercase
- Attribute values should be enclosed in quotes, preferably double quotes by convention

An example of valid XHTML markup, where these things are used is:

```
<form action="action.php" method="post">
   Your email:
   <input name="email" type="text" />
```


For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

```
    <br />
    <input id="flag" name="subscribe"
       type="checkbox" checked="checked" />
       <label for="flag"> Send me updates</label>
    <input type="submit" value="Subscribe" />
</form>
```

Developing true client-side applications with pure XHTML is not an easy task, because the technology was designed to markup hypertext, not to develop Application User Interfaces. XHTML lacks sophisticated components for user input, interaction, and layout. The Backbase Tag Library is adding these building blocks. Let us take a closer look.

The Backbase Tag Library

The focus of this chapter is the Backbase Tag Library (BTL). BTL concerns itself with the visible aspect of a web application user interface. For its dynamic behavior, we need JavaScript, or the XML Execution Language and Command Functions tag libraries that we will cover in the next chapter.

When you are developing a user interface, you will find that you are solving the same problems over and over again:

- Create a layout
- Show a menu of options
- Have tabs to structure the space on a page
- Provide pop ups and tool tips
- Do form validation

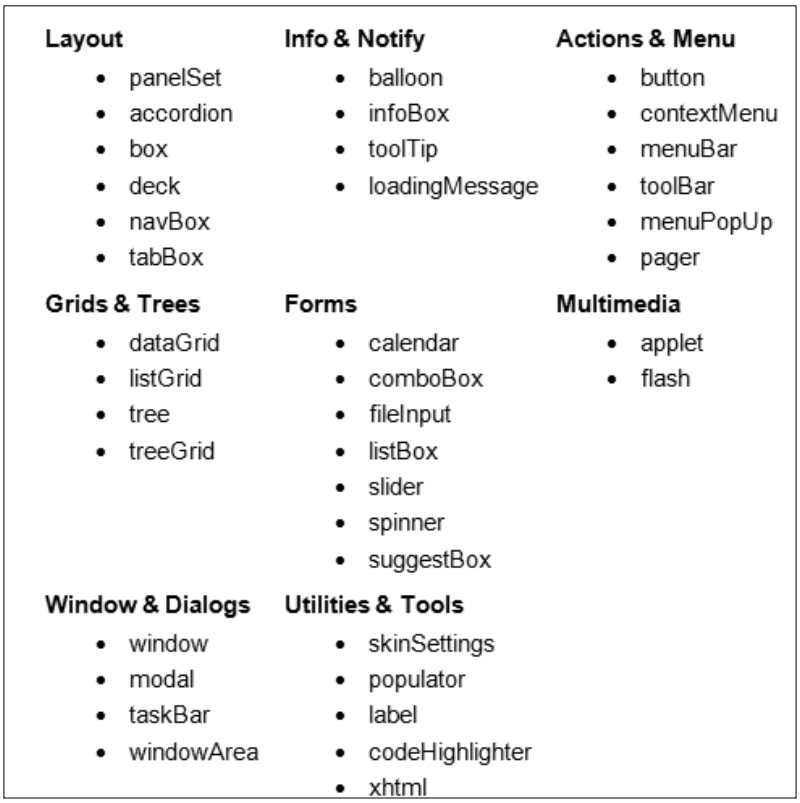
These are just a few examples from a long list. The BTL is a set of UI widgets that can be used out of the box, which are extensible, and should appear the same in all browsers. By using these, you should be able to develop your website faster with a more robust result.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

Backbase Tag Library widget overview

There are eight categories of BTL widgets for every aspect of layout and user interaction. If that is not enough, you can extend the BTL widgets to add new behavior or new looks. You can also develop your own widgets as we'll see in detail in the chapter about the Tag Definition Language.

The following schema shows an overview of the widgets that are available:



There is also a ninth category of BTL elements. They are special because they can appear as attributes on other tags to specify extra behaviors that can be applied to any UI element. An example of such a behavior is drag-and-drop. We will cover drag-and-drop in Chapter 6.

If you are using the Backbase Explorer that we encountered in the previous chapter to find examples for the BTL widgets (`http://demo.backbase.com/explorer/`), the schema shown above may be a handy reference to find widgets you are looking for.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

We always use the `b` prefix when referring to BTL widgets, although you can use whatever (nonconflicting) prefix you want.

The BTL abstract elements

If you are interested mainly in learning what BTL widgets look like, then the subject of this section about abstract elements maybe a little too abstract. Feel free to skip it, but before you do, take a look at the picture of the inheritance relationships between abstract elements. The picture shows the attributes that are available on many BTL elements.

Most of these attributes will be familiar to you and remind you of a not so distant past when you were still coding HTML instead of XHTML. While coding XHTML instead of HTML, you should use `class` and `style` instead of more specific attributes like `width` or `margin`. However, while using BTL, you must partly unlearn this for the BTL elements because using `class` or `style` could upset the styling that is done for the BTL elements, to make them look as they do.

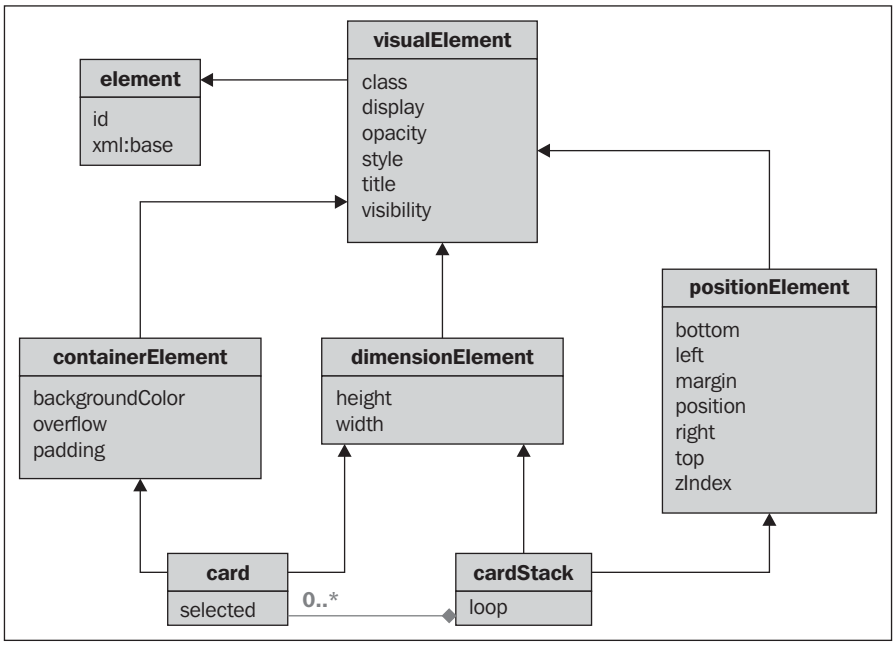
Abstract element inheritance structure

The BTL markup language was developed using the Backbase Tag Definition Language. This means that BTL widgets are objects that can inherit properties from other TDL objects. It also means that you are able to extend the BTL objects into customized objects suitable for your application.

The BTL objects that we are looking at in this chapter, the layout objects, inherit from more basic, abstract objects. It is useful to look at some of these abstract elements because their attributes can be used by inheritance on the layout objects. The BTL elements we will be looking at are `element`, `containerElement`, `dimensionElement`, `postionElement`, and `visualElement`. All layout BTL elements inherit from these.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

Here is a diagram of the inheritance structure:



For those of you who are not so familiar with object-oriented models: the picture says that `element` is the object from which all others inherit. Therefore, for all BTL widgets, you can use the `id` and `xml:base` attributes, because these are defined on the `element` element.

The Backbase Tag Definition Language supports multiple inheritance. Therefore, a `cardStack` element can use the attributes of both `dimensionElement` and `positionElement`, and by looking further up in the tree, also of `visualElement` and `element`.

The relationship between `card` and `cardStack` says that a `cardStack` can contain zero or more `card` elements.

The picture does not describe the methods available. The only public methods that are interesting, belong to `cardStack`, which has the `next` and `previous` methods.

Now, let's look at some of the BTL elements in detail:

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

element

Base element from which all the elements in the BTL namespace are derived.

Attribute	Description
`id`	Unique ID of the element.
`xml:base`	Specifies a base URI other than the base URI of the document or external entity. The value of this attribute is interpreted as a URI reference.

Although `element` has no parent within the BTL namespace, it derives from the `element` JavaScript object in the DOM Core of the Backbase framework. The `element` JavaScript object implements the `node` interface, which means that all familiar DOM-related attributes and methods to append and remove children, and to navigate the DOM tree, are available. See the Backbase Reference for more details.

visualElement

An element from which all the visual elements in the BTL namespace are derived. This element takes care of some of the visual and interaction aspects.

`visualElement` inherits from `element`.

Attribute	Description
`class`	Used to set CSS classes to BTL elements. It is not recommended that this attribute be used, as it might break the styling of controls. More specific attributes are implemented to take care of certain styling properties. Font-related styling can be used safely.
`display`	Sets how the element is displayed. It works like the CSS `display` property. Because setting `display` can be tricky in some cases, the `true` and `false` values have been added. False does exactly the same as none, and true will reset the display property of the `viewNode`. The result is that the element is displayed according to the default rules or according to settings specified in the CSS classes.
`opacity`	Sets the opacity of the element, allowing you to see through it. It works like the CSS3 `opacity` property. It (decimal) ranges between 0.0 (not visible) to 1.0 (100% visible).

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

Attribute	Description
`style`	Used to set styles to BTL elements. It is not recommended that this attribute be used because it might break the styling of controls. More specific attributes are implemented to take care of certain styling properties. Font-related styling can be used safely.
`title`	Sets the title of the element.
`visibility`	Sets the visibility of the element. It works like the CSS `visibility` property. As opposed to setting the display, setting the visibility of the element does not change its dimensions. It will not disappear from the layout.

positionElement

This element implements attributes that can position the elements that inherit from it.

`positionElement` inherits from `visualElement`.

Attribute	Description
`bottom`	Sets the distance from the bottom of the element to the bottom of the offset parent. It works like the CSS `bottom` property. You must add the proper CSS unit type.
`left`	Sets the distance from the left side of the element to the left side of the offset parent. It works like the CSS `left` property. You must add the proper unit type.
`margin`	Sets the margin around the element. It works like the CSS `margin` property. You must add the proper unit type.
`position`	Sets the position of the element. It works like the CSS `position` property.
`right`	Sets the distance from the right side of the element to the right side of the offset parent. It works like the CSS `right` property. You must add the proper CSS unit type (for example, px).
`top`	Sets the distance from the top of the element to the top of the offset parent. It works like the CSS top property. You must add the proper CSS unit type (for example, px).
`zIndex`	Sets the z-index of the element. It works like the CSS `z-index` property.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

dimensionElement

This element implements attributes that set the dimensions of the elements that inherit from it.

`dimensionElement` inherits from `visualElement`.

Attribute	Description
`height`	Sets the height of the widget. The widget height is relative to the height of its container.
`width`	Sets the width of the widget. The widget width is relative to the width of its container.

cardStack and card

There is a set of layout widgets that have a container—containment relationship. They use **cardStack** and **card** to inherit from. The widgets involved are:

- `accordion` and `accordionItem`
- `deck` and `deckItem`
- `tabBox` and `tab`

`cardStack` is the parent element for all widgets that represent a stack of cards. It allows users to navigate through items (cards). The content of the card on top will be visible.

`cardStack` has one attribute and a set of methods that can be called to navigate through the stack.

`cardStack` inherits from `disableElement`, `dimensionElement`, and `positionElement`.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

Attribute	Description
`loop`	When set to `true`, the `previous` or `next` methods will, when called, continue to select either the last or first item. If set to `false`, these methods will not continue to select an item when reaching the beginning or end of the list.
Method	**Description**
`next`	Selects the next item in the `cardStack` (that is not disabled). If the `loop` attribute is set to `false`, it will not select an item when the end of the list is reached. If set to `true`, it will continue with the first item in the list.
`previous`	Selects the previous item in the `cardStack` (that is not disabled). If the `loop` attribute is set to `false`, it will not select an item when the beginning of the list is reached. If set to `true`, it will continue with the last item in the list.

A `card` is an abstract element that provides the ability to enable and disable a widget. When the `selected` attribute is set to true, this card is the one that is shown when the `cardStack` is loaded into the page.

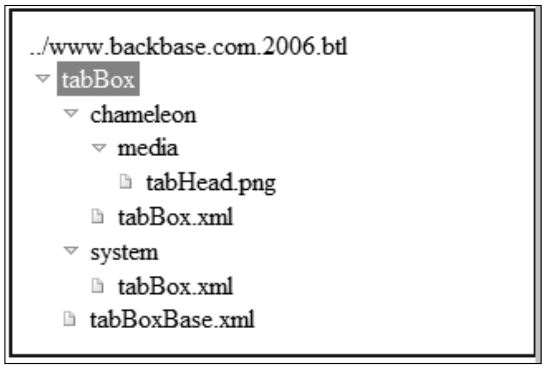
`card` inherits from `disableElement`, `dimensionElement`, and `containerElement`.

Attribute	Description
`selected`	The selected state of the item (`true`/`false`).

This section does *not* sum up all the basic abstract elements implemented in BTL. For example, `disableElement` or `focusableElement` may interest you, for which you can find the details, as always, in the *Reference.*

There is another set of abstract elements that you will find mentioned in the Reference—the `base` element for each widget. Many widgets have a generic implementation that is common to both the system and the chameleon skin, and then specific implementations for each skin. The file structure for the `tabBox` widget, for example, is as follows:

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book



For both the chameleon and the system skin, there is a `tabBox` BTL object, which inherits from the `tabBoxBase` BTL object. In fact, it is the `tabBoxBase` object that inherits from all basic elements as described before. The `tabBox` itself conveniently inherits everything from its base object.

Just for fun, we created the previous picture from the following code snippet:

```
<b:tree xmlns="http://www.w3.org/1999/xhtml"
   xmlns:b="http://www.backbase.com/2006/btl">
   <b:treeBranch open="true">
      <b:label>../www.backbase.com.2006.btl/tabBox</b:label>
      <b:treeBranch label="chameleon">
         <b:treeBranch label="media" open="true">
            <b:treeLeaf label="tabHead.png" />
         </b:treeBranch>
         <b:treeLeaf label="tabBox.xml" />
      </b:treeBranch>
      <b:treeBranch label="system" open="true">
         <b:treeLeaf label="tabBox.xml" />
      </b:treeBranch>
      <b:treeLeaf label="tabBoxBase.xml" />
   </b:treeBranch>
</b:tree>
```

This code hardly needs explanation by now.

From now on, we will usually take the existence of the `base` element for granted and ignore it in our description of inheritance relationships.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

Now, we have all the background we need to know how the layout widgets are constructed. With this in mind, you can use the information in the next section without needing to look into the Backbase API Reference because we will mention the specific attributes for each widget. By looking at the inheritance information that we showed earlier, you will know what inherited attributes you can use.

The layout widgets

BTL has a number of widgets that are intended to perform the most common layout tasks while developing an application user interface.

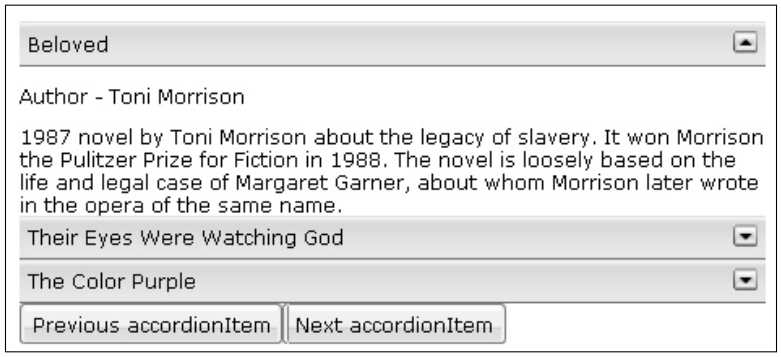
We will describe these widgets in this section and give you examples of their use. You can see the widgets in action by using the BTL Exerciser described at the end of this chapter.

We will look at the layout widgets in an alphabetical order. Therefore, the first one is accordion.

Accordion

An **accordion** efficiently groups together content, only showing the selected **accordionItem**.

`accordion` and `accordionItem` inherit from `cardStack` and `card`. They do not have local attributes or methods.


Beloved
Author - Toni Morrison
1987 novel by Toni Morrison about the legacy of slavery. It won Morrison the Pulitzer Prize for Fiction in 1988. The novel is loosely based on the life and legal case of Margaret Garner, about whom Morrison later wrote in the opera of the same name.
Their Eyes Were Watching God
The Color Purple
Previous accordionItem
Next accordionItem

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

When a user clicks on one of the header panes in an `accordion`, the body pane of the `accordion` is revealed. All header elements are always visible. The sequence of panes is determined by the order of the child `accordionItem` elements. By setting the `selected` attribute to `true`, you can determine which `accordionItem` is selected when the widget is put on the page.

An `accordion` always has one and only one item open. If you open another item, the item that was open before will be automatically closed. The `navBox` is very similar to an `accordion` in appearance, but it can have as many items open as you like.

The `accordion` has `previous` and `next` methods (inherited from `cardStack`), to navigate between `accordionItems`. Note the `loop` attribute (inherited from `cardStack`) set on the `accordion`. When the `loop` attribute is set to a value of `true`, the `previous` and `next` methods will loop after reaching the first/last `accordionItem`.

The example that follows shows an `accordion`. The first snippet shows the `accordion` itself, the second snippet shows two buttons with `click` event handlers. These buttons can be used as an alternative way to navigate the `accordion`.

Note the use of the `b:label` element instead of the `label` attribute in the third `accordionItem`. This element allows for inserting more than just text into the label, for example, icons. Here's the code snippet that shows the `accordion`:

```
<b:accordion loop="true" width="250px">
   <b:accordionItem label="Beloved">
      <p>Author - Toni Morrison</p>
      <p> ... </p>
   </b:accordionItem>
   <b:accordionItem label="Their Eyes Were Watching God"
      selected="true">
      <p>Author - Zora Neale Hurston</p>
      <p> ... </p>
   </b:accordionItem>
   <b:accordionItem>
      <b:label>The Color Purple</b:label>
      <p>Author - Alice Walker</p>
      <p> ... </p>
   </b:accordionItem>
</b:accordion>
```

In the next snippet, each of the two buttons contains an XEL event handler (using the `handler` tag). When the button is clicked, the event is handled, and `previous` and `next` methods are called. These methods belong to the `accordion`. They allow navigation back and forward through the `accordion` items.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

```
<b:button>
   Previous accordionItem
   <e:handler event="click">
      <e:call with="preceding::b:accordion[last()]"
         method="previous" />
   </e:handler>
</b:button>
<b:button>
   Next accordionItem
   <e:handler event="click">
   <e:call with="preceding::b:accordion[last()]"
      method="next" />
   </e:handler>
</b:button>
```

Look at the `e:call` statements in the event handlers for the buttons. The `with` attribute has the value `preceding::b:accordion[last()]` in both cases. This is an XPath expression that says "Find the set of elements in the DOM tree before this `button` element. Of these, select all accordions in the `b` namespace. Of these, find the last element".

The support for XPath expressions is an important and powerful feature of the Backbase framework. Many attributes in the Backbase markup languages can have an XPath expression as their value. You can find details about XPath in the API Reference and the Application Development Guide. We will see more of it in the next chapter when we talk about XEL and commands.

Why is this complicated XPath expression preferable over the more simple XPath expression: `id('my-accordion')`? Well, in that case, I need to give the accordion an ID. Imagine that you have more than one accordion in your application UI, or more applications with `accordion` elements. You could then extend the `accordion` into a new widget that always has the `previous` and `next` buttons, and you would not have the problem of coping with `id` attributes in multiple `accordion` elements that cannot have the same value.

There is also a disadvantage. If you were not sure about the relative position of the buttons and the accordion, it would be difficult to use an XPath expression, while if you were using an ID, it would not matter.

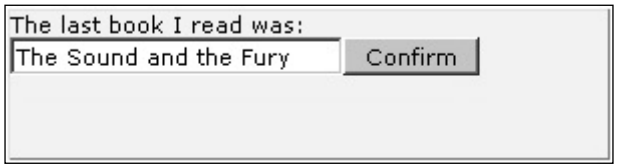
A last remark before we look at the next widget. If you have many elements, such as a number of input fields in your `accordionItems`, then you may experience timing problems when the `accordion` is loaded. Look at the tips section later in this chapter for a solution to this problem.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

Box

The **box** widget allows you to create a styled container for generic content. Use this to group components and define layout.

`box` inherits from `containerElement`, `dimensionElement`, and `positionElement`. `box` does not have local attributes or methods.



The `box` widget accepts text, images, and other BTL widgets.

The `box` is very similar to a `div` element. It has a default styling of a darker background. Here's the code snippet that shows the `box` widget:

```
<b:box width="300px" height="75px">
  The last book I read was:
   <div>
      <input type="text"
         size="25" value="The Sound and the Fury"
         name="lastBook"/>
      <button>Confirm</button>
   </div>
</b:box>
```

deck

The **deck** widget presents multiple panes, one at a time of which is visible, just like a deck of playing cards.

`deck` and `deckItem` inherit from `cardStack` and `card` respectively. They do not have local attributes or methods.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

Each pane in the `deck` is called a `deckItem` (it is really a `card`). The content of each `deckItem` element determines the content of the `deck`. The order of `deckItems` in the `deck` represents the sequence in which they will be displayed.

While the `deck` has built-in `previous` and `next` methods (inherited from `cardStack`), you must create the buttons and handlers that trigger navigation between `card` elements in the `deck`. You will also be responsible for any other functionality that must occur while navigating between cards.

Here is a simple example of a `deck` with two buttons that navigate to the next and previous `deckItem` in the `deck`. One of the buttons is written in XEL, while the other is written in JavaScript.

The JavaScript version uses an XPath expression to find the deck. The JavaScript that you could use to find the element by ID is commented out.

```
<h1>Booker Prize Winners:</h1>
<b:deck id="mydeck" loop="true">
   <b:deckItem>2002 - Yann Martel</b:deckItem>
    <b:deckItem>2003 - DBC Pierre</b:deckItem>
   <b:deckItem>2004 - Alan Hollinghurst</b:deckItem>
   <b:deckItem>2005 - John Banville</b:deckItem>
   <b:deckItem selected="true">2006 - Kiran Desai</b:deckItem>
</b:deck>
<button>Previous Card
   <e:handler event="click">
      <e:call with="id('mydeck')" method="previous"/>
    </e:handler>
</button>
<button>Next Card
   <e:handler event="click" type="text/javascript">
      //var oDeck = bb.document.getElementById('mydeck');
      var oDeck = this.selectSingleNode('preceding::b:deck[1]');
      oDeck.next();
   </e:handler>
</button>
```


For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

navBox

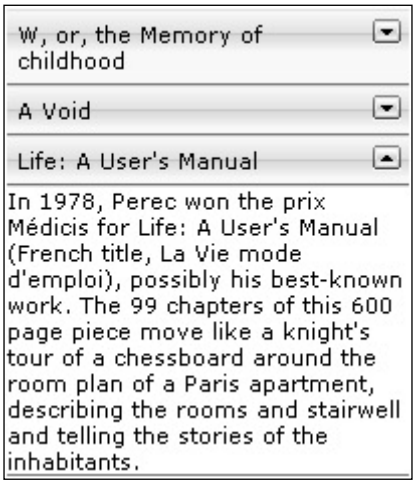
The **navBox** widget shows and hides levels of sub-navigation and further detail. Its appearance is the same as an `accordionItem`.

`navBox` inherits from `containerElement`, `dimensionElement`, and `positionElement`.

`navBox` also inherits from `focusableElement`, `iconElement`, and `labelImplementor`.

Attribute	Description
`open`	If `true`, the widget will be open initially.
Method	**Description**
`open`	Opens the widget.
`close`	Closes the widget.

Each `navBox` has a header widget (defined by the value of the `label` attribute) and related content, which can be static or dynamic text, links, images, or other widgets. Clicking on the head widget expands or collapses the body widget with the related content as shown in the following screenshot:


W, or, the Memory of childhood
A Void
Life: A User's Manual
In 1978, Perec won the prix Médicis for Life: A User's Manual (French title, La Vie mode d'emploi), possibly his best-known work. The 99 chapters of this 600 page piece move like a knight's tour of a chessboard around the room plan of a Paris apartment, describing the rooms and stairwell and telling the stories of the inhabitants.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

The navBox widget can expand multiple topics simultaneously. If you want to have only one topic visible at a time, you can use an accordion or a tabBox. Unlike the accordion, each navBox operates completely independent of the other, therefore, a set of navBox elements do not need a container like the accordionItem elements do.

Here is an example:

```
<b:navBox width="200px"
label="W, or, the Memory of childhood" open="false">
W ou le souvenir d'enfance, (W, or, the Memory of Childhood, 1975)
is a semi-autobiographical work, hard to classify. Two alternating
narratives make up the volume, one a fictional outline of a
totalitarian island country called "W", patterned partly on life in
a concentration camp, and the second, descriptions of childhood,
that merge towards the end when the common theme of the Holocaust is
explained.
</b:navBox>
<b:navBox width="200px" label="A Void" open="false">
Perec is also noted for his constrained writing: his 300 page novel A
Void (La disparition, 1969) is a lipogram, written without ever using
the letter "e". It has been translated into English by Gilbert Adair
under the title A Void (1994).
</b:navBox>
<b:navBox width="200px" label="Life: A User's Manual">
In 1978, Perec won the prix Médicis for Life: A User's Manual (French
title, La Vie mode d'emploi), possibly his best-known work. The
99 chapters of this 600 page piece move like a knight's tour of a
chessboard around the room plan of a Paris apartment, describing the
rooms and stairwell and telling the stories of the inhabitants.
</b:navBox>
```

panelSet

The **panelSet** widget partitions the screen layout into rows and columns.

panelSet inherits from dimensionElement and positionElement. See the table below for the attributes that are specific for panelSet.

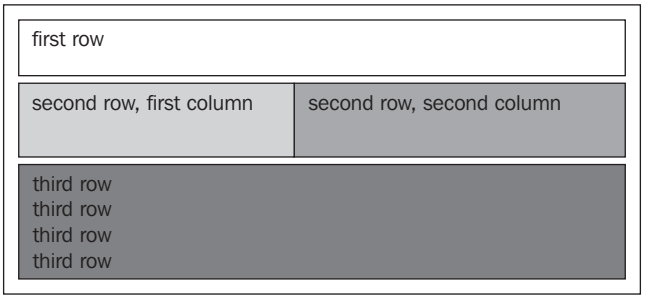
panel inherits from containerElement and does not have local attributes or methods.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

The `panelSet` has a number of specific attributes:

Attribute	Description
`columns`	Specifies the column dimensions, defining values, or a space-separated set of values in %, px, pc, pt, em, ex, in, cm, or mm. You can also use the wildcard asterisk "*" sign to fill the remaining space. You can use rows and columns attributes simultaneously to create a panel matrix.
`fullScreen`	Tells the `panelSet` to expand its area to the browser view port.
`rows`	Specifies the row dimensions, defining values, or a space-separated set of values in %, px, pc, pt, em, ex, in, cm, or mm. You can also use the wildcard asterisk "*" sign to fill the remaining space. You can use rows and columns attributes simultaneously to create a panel matrix.
`splitter`	The `panelSet` can be resized using a splitter when this attribute is set to true.
`splitterSize`	Size of the splitter between panels in the `panelSet`.

When subdividing a `panelSet`, you use the **panel** element, or you can use another `panelSet` widget to further subdivide that row/column. You can specify a `panelSet` to have rows, columns, or both. By using the `splitter="true"` attribute/value pair, you can add a resizable border to your `panelSet`.



The orientation of the `panelSet` can be set using either the `rows` or `columns` attribute.

The number of rows or columns is defined by the number of space-separated unit values in the attribute. For instance, we create two columns by setting the `columns` attribute to `"200px 600px"`. To create three columns, we should have set the attribute value to `"200px 200px 600px"`. For five columns, you can use `"50px 100px 100px 100px 50px"`. If not specified differently, the width of the `panelSet` widget will automatically adjust to the sum of the column widths.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

Note that a `panelSet` with a width of 800px will have an empty space on the right for users with a screen resolution of 1024x768 or higher. This can be solved by using the "*" wildcard. This way, the row or column will fill up its container in the browser window. The asterisk wildcard can only be used once within the `panelSet`. For example, the five columns `panelSet` can also use `"50px 100px * 100px 50px"`, where the third column will automatically adjust its width to ensure that the `panelSet` occupies the entire container area.

The `panel` and `panelSet` widgets behave like a `div` tag. By themselves, they do not have width or height. Therefore, you must add some styling to make a `panelSet` visible. A simple way to achieve visibility is to add the `fullScreen="true"` to the `panelSet` tag. Another option is to surround the `panelSet` with a `div`. For example:

```
<div style="width:600px; height:400px;">
```

Warning: Microsoft Internet Explorer performs slower if ancestor elements of a `panelSet` have the style attribute set to `height: 100%`. To resolve this, for the parent elements that have `style="height: 100%"`, add the style attribute `overflow: auto` or `overflow: hidden`.

The `panel` tag represents the column or row as specified by the `columns` or `rows` attributes of `panelSet`. Therefore, it is important that there are as many `panel` tags nested in the `panelSet` as there are defined rows or columns. Child elements of the `panel` tag constitute the content of the panel.

It is also possible to use a nested `panelSet` tag instead of the `panel` tag. Be aware that there should eventually be as many `panel` tags as there are columns or rows defined in (nested) `panelSets`.

Here is a `panelSet` with `panels` example:

In the following example, there are three rows, where the second row is divided into two columns:

```
<div style="width:600px; height:200px;">
<b:panelSet rows="50px * 60px" splitter="true">
   <b:panel backgroundColor="#A9E9E2">first row</b:panel>
   <b:panelSet columns="30% *">
      <b:panel backgroundColor="#99FF99">
         second row, first column
      </b:panel>
      <b:panel backgroundColor="#FFCCFF">
         second row, second column
      </b:panel>
```


For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

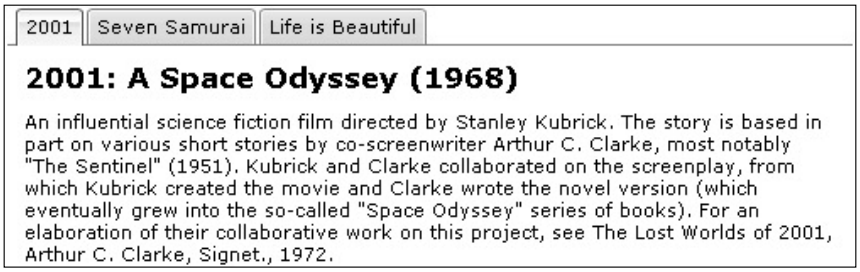
```
    </b:panelSet>
    <b:panel backgroundColor="#DF8E8E">
       third row
       <br />
       third row
       <br />
       third row
       <br />
       third row
    </b:panel>
</b:panelSet>
</div>
```

tabBox

A **tabBox** is a container for multiple items that can be selected through tabs.

`tabBox` and `tab` inherit from `cardStack` and `card`.
`tabBox` is focusable by inheriting from `focusableElement`.
`tab` can have a `label` by inheriting from `labelImplementor`.
`tabBox` and `tab` do not have local attributes or methods.

This is how a `tabBox` widget looks:


2001
Seven Samurai
Life is Beautiful
2001: A Space Odyssey (1968)
An influential science fiction film directed by Stanley Kubrick. The story is based in part on various short stories by co-screenwriter Arthur C. Clarke, most notably "The Sentinel" (1951). Kubrick and Clarke collaborated on the screenplay, from which Kubrick created the movie and Clarke wrote the novel version (which eventually grew into the so-called "Space Odyssey" series of books). For an elaboration of their collaborative work on this project, see The Lost Worlds of 2001, Arthur C. Clarke, Signet., 1972.

When a user clicks on one of the header panes in a `tabBox` widget, the body pane of the `tabBox` is revealed. All the header elements are always visible. The sequence of panes is determined by the order of the child `tab` elements. The value of the `label` attribute determines the text header of each tab.

The `tabBox` is functionally similar to an `accordion`. The difference between the two widgets is their visual presentation. While the `tabBox` has a horizontal orientation that looks like a Rolodex or tabbed address book, the `accordion` has a vertical orientation.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

You can navigate between tabs by using the left and right arrow keys.

Here is a BTL `tabBox` example. Note how you can put other XHTML or BTL widgets inside a `tab`:

```
<b:tabBox>
   <b:tab label="Person">
      <div class="container">
         <table class="form-table">
            <tbody>
               <tr>
               <!-- omitted code: input form fields,
                    we just leave the birth date to show
                  the b:calendar -->
                  <tr>
                     <td class="form-left">
                        <label
                           for="input_person_birth_date">
                           Birth Date:</label>
                     </td>
                     <td class="form-right">
                        <b:calendar
                           name="person_birth_date"
                           id="input_person_birth_date"/>
                     </td>
                  </tr>
                  </tr>
            </tbody>
         </table>
      </div>
   </b:tab>
   <b:tab label="Address"/> <!-- this tab is empty -->
</b:tabBox>
```

`tabBox` is the last of the layout widgets. So far, we have concentrated on the visual and static aspects of a web application page. What happens and how to code it when a user interacts with your application, will be shown in detail in the next chapter. We conclude the description of widgets in this chapter by showing a few utility elements.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

The BTL utility elements

There are a number of elements in the BTL library that only have a utilitarian purpose. Here is a short overview of these. In particular, you will see `populator` used in our BTL Exerciser sample application to lazily load tab panel contents.

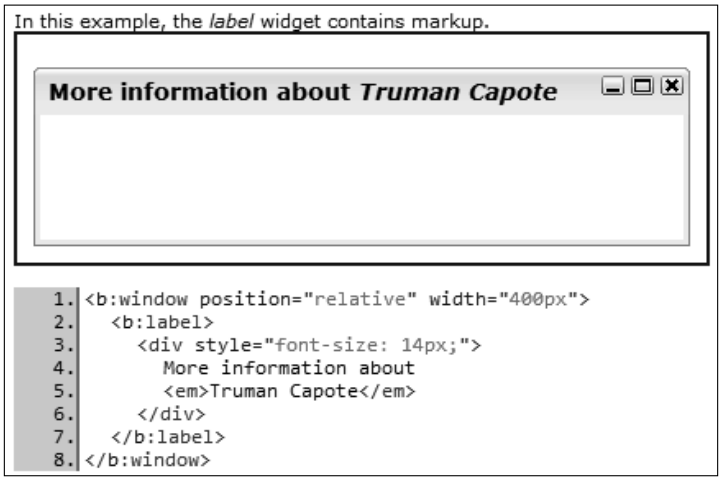
codeHighlighter

This is an internal element that you can use to show code in a nice way. All examples in the API Reference are shown using the highlighter. For example, see the following section about the `label` widget for how the picture of the label example is followed by the highlighted source code. The highlighter can be used as follows:

```
<b:codeHighlighter>
   <!-- your valid piece of XML here -->
</b:codeHighlighter>
```

label

Many BTL widgets support a `label` attribute, where, for example, you can specify a simple text to be shown in a title bar. If you need more than simple text, you can use the `label` element, which allows markup and icon images within your label.



For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

populator

populator is a utility widget that implements lazy loading, allowing content to be loaded upon request.

Attribute	Description
`events`	Default: "select". Space-separated list of events that will trigger loading.
`type`	Default: "once". Specifies the behavior of lazy loading. If set to `once`, it will load the content only once. This is useful when working with static content that will not change. Setting this attribute to `always` will make the lazy loader connect to the server every time one of the events occur to which the `populator` element is listening.
`url`	Specifies the URL that will be loaded.
Method	**Description**
`populate`	Loads the resource specified in the `url` attribute.

A custom loading message can be placed inside the `populator` element.

This element is often used in conjunction with a `tabBox`, to load contents of a tab panel on request.

The loaded contents will be appended after the `populator` element. Any previously loaded contents will be removed.

skinSettings

This element can be used to set a number of styling attributes of the chameleon skin. We will give more detail about these settings in the section about styling later in this chapter.

xhtml and xml

`xhtml` is a tag that can be used within a Backbase area to signal the Backbase runtime engine that the contents between the start and end tag do not need to be processed. This is useful to optimize performance if you have a block of plain XHTML code. The following code snippet shows the use of `xhtml` tag:

```
<p style="border:1px solid blue">
   This XHTML code is processed by the Backbase Engine.
</p>
```


For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

```
<b:xhtml>
   <p style="border:1px solid green">
      This XHTML code is processed by the client browser.
   </p>
</b:xhtml>
```

`xml` is a tag that does the opposite. It can be used for escaping back into an area that is processed by the Backbase Client Runtime, when used within the BTL `xhtml` tag.

You can place `xml` elements within an `xhtml` element to force processing by the Client Runtime.

Several attributes that affect the style of the `xml` element are available. In the example, `backgroundColor` is used. To make the background color visible, `style="display: block;"` must be specified.

```
<b:xhtml>
   <p>This is outside the Backbase space</p>
   <b:xml backgroundColor="yellow" style="display: block;">
      <p>This is inside the Backbase space</p>
      <b:calendar mode="inline" />
   </b:xml>
   <p>This is outside the Backbase space</p>
</b:xhtml>
```

Styling techniques for GUI widgets

This section talks about CSS and about the two skins available in the Backbase framework—the chameleon skin and the system skin.

We assume that you have experience working with CSS (Cascading Style Sheets). You probably did style your web pages by coloring texts and by filling areas with background images, or by drawing borders. Another aspect of using CSS is to specify layout for HTML, which you probably are familiar with too.

In this section, we will cover both aspects, that is, using CSS in Backbase applications as well as other facilities that are available.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

Using CSS

CSS helps you to separate visual aspects of the application from its content markup. Generally speaking, you can use CSS to style many properties of your application markup, such as colors, fonts, sizes, positioning, and so on. The following example shows how an ID selector was used to give the calendar component a width:

```
<style type="text/css">
   #myCalendar { width: 200px; }
</style>
<b:calendar id="myCalendar" />
```

Keep in mind that Internet Explorer doesn't support multiple class selectors. So, creating a rule `.myclass1 .myclass2` will be applied only to elements that have either `myclass1` and/or `myclass2` classes specified.

Styling BTL components can also be done with CSS. However, here you need to follow certain conventions. Let's take a look at an example:

```
<style type="text/css">
   .btl-calendar-input { color: red; }
</style>
<b:calendar value="10/03/2009" />
```

Here, we gave a red color to the text that displays the calendar value. The class selector we used was constructed by concatenating the following parts with a `-` character: `btl`, indicating the BTL component namespace, `calendar` for the name of the component, and `input`, indicating that this style is to be applied to the component's input field.

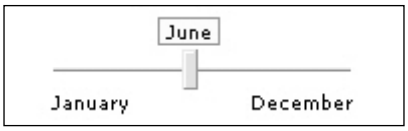
You can style other BTL components in a similar way.

Skinning

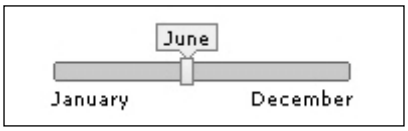
When a set of widgets share a common skin, a consistent look and feel is propagated throughout the web application.

The Backbase Client Framework provides two skins for all renderable BTL elements: a system skin, which has the same look and feel as the Windows XP classic skin, and a modern, configurable chameleon skin. This is how a `slider` widget looks in system skin:

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book



Here's how the same `slider` widget looks in chameleon skin:



You can change the skin used by altering the `backbase/4_4_1/bindings/config.xml` file. In this file, alter the value of the `href` attribute in the `include` statement to reflect the `system` skin file (`config.xhtml_btl.system.xml`) or the `chameleon` skin file (`config.xhtml_btl.chameleon.xml`).

For example, to change the skin to a chameleon skin, you can use this code:

```
<include xmlns="http://www.w3.org/2001/XInclude"
  href="config.xhtml_btl.chameleon.xml" />
```

The Backbase Client Framework provides a few different options to alter the look and feel of Backbase widgets. The application developer can alter the chameleon skin simply by updating attribute values in the skin settings.

The BTL skinSettings widget

When using the chameleon skin, a tag called `skinSettings` is available. This tag has attributes that allow you to alter the background and text colors of the chameleon skin.

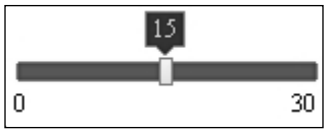
The `slider`, in this example, will be yellow; the button will have a purple border when pressed, and the `calendar` will show a variety of colors when dates are clicked:

```
<b:skinSettings activeText="cyan" highlightText="green"
activeBackground="yellow" activeBorder="purple" />
   <p>
   <b:slider id="mySlider"
      max="30" min="0" step="2" value="15" />
   </p>
   <p>
      <b:button> This is a button </b:button>
   </p>
```


For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

```
<p>
   <b:calendar mode="inline" />
</p>
```

Default colors are represented by the default values of attributes of the `skinSettings.xml` widget. By changing these attributes, you alter the stylesheet settings.



Refer to the API Reference for the default values of the `chameleon` skin.

Many features of the Backbase chameleon skin cannot be customized as easily as it may seem from this story. One reason is the use of background images and the other reason is that the intricate interplay of the various CSS settings can easily be upset if you change things.

If you don't want to use the `chameleon` skin, or you only want to alter a subset of the `chameleon` skin widgets, or want to create your own skin, you will have to extend widget(s) using TDL. Refer to the *Widget Development Guide* for more information.

Height problems

When putting GUI widgets on a page, it may happen that they look different than what you expected in the browser. Especially, the `panelSet` has a tendency to not appear at all, causing frustration to developers. Let's look at the cause and its solutions.

It can happen that the container element of the widget does not have a height set. In that case, the container will be sized according to the contents of the container. By default many BTL widgets do have a height of 100%, but if the height of the container is not set, this may be 100% of zero. The widget will collapse and will not be visible.

Solutions to these problems are as follows:

- Don't use `height: 100%` but use a fixed height.
- Set a height to the container. While using 100%, please understand that you're setting a size relative to the (offset) parent. You are actively setting a relative size. If you are not aware of the size of the (offset) parent, you may have to start with setting the height of the `html` element to 100%.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

Part of the issue is the browser behavior. Take the following test case:

```
<!-- -->
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.1//EN"
  "http://www.w3.org/TR/xhtml11/DTD/xhtml11.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
   <head>
      <style type="text/css">
         html { background-color: blue; }
         body { background-color: red; }
      </style>
   </head>
   <body> </body>
</html>
```

You will find that in Firefox, the color you see will be blue. In Internet Explorer, in quirks mode, it is red. In IE, in standards mode, it will be blue, but with a red bar (even if there is no content in the body). The conclusion is that the body does not have a height initially (the content would determine the height). A height of 100% of something that has no height will result in no height.

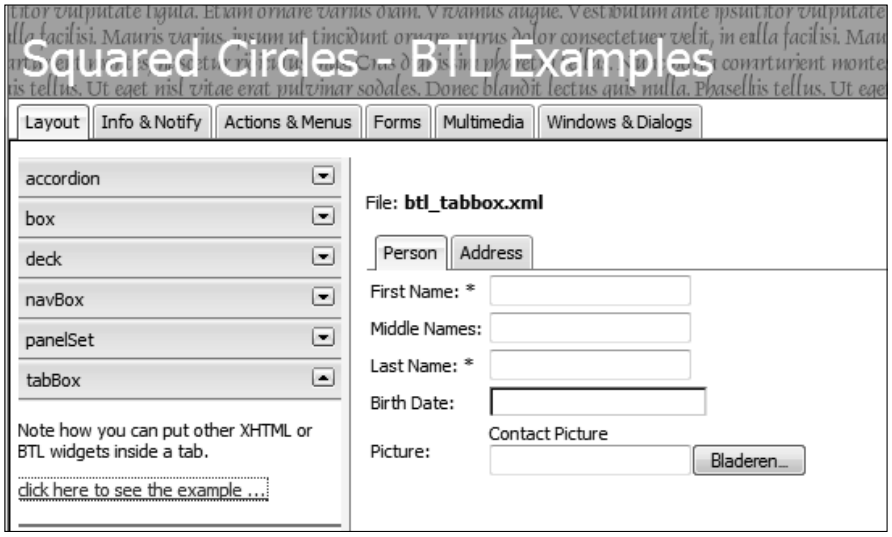
The next step is to give the `body` a `height`. If we want "full screen" behavior, we will use 100%. However, the screen will still only show a blue background. Setting a height to the `html` element quickly solves this.

There is much more to tell about skinning and ways to change the looks of BTL elements. When appropriate, we will add some more information about this subject in our examples.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

A BTL Exerciser

In this section, we introduce an example application, a BTL Exerciser, which you can use to execute the BTL examples shown in this chapter and later chapters. This application uses functionality learned in this chapter and it gives a simple way to see what the examples that are described in this chapter look like when executed. Each of the examples is stored in a separate file. This makes it easy to look at the code or to add your own examples. The picture below shows the application showing the `tabBox` example:



The BTL Exerciser application builds upon the *Basic Layout* application that we made in the previous chapter. If you want to follow along building this application, then make a copy of the `myApp1` folder in the same `examples` folder, and name it `btlSamples`, or some other name that you like better.

The application structure

The structure of the application is similar to what we had in the first chapter, while showing the basic application layout.

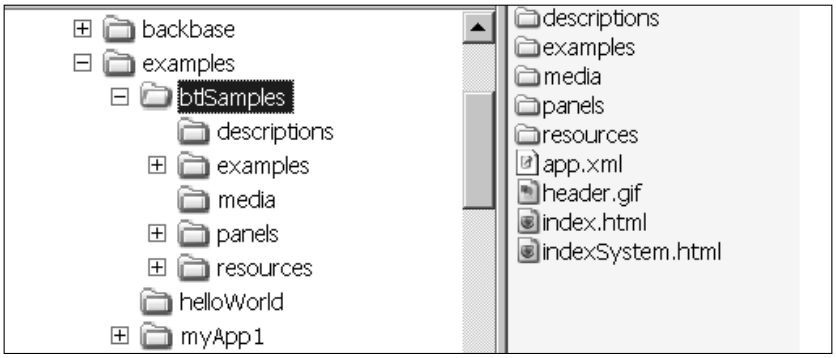
In the `btlSamples` folder, you will see the `index.html` file that contains the `include` statements for the Backbase framework libraries and also, there is the `app.xml` file, which contains the basic application layout.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

We have some subfolders in the `examples` folder:

- `resources`: contains application-specific widgets, CSS files, and images.
- `panels`: contains the definitions for the tab panels, as we will see.
- The BTL examples are contained in two folders: `descriptions` and `examples`. Their name says it all. You will find files in these with names such as `btl_accordion.xml`, `btl_balloon.xml`, and so on.

See the picture below for an overview of this structure. The Backbase framework does not enforce a directory structure such as, for example, the Ruby on Rails framework does. However, we recommend setting a structure for yourself that allows you and your co-workers to find all application-related items quickly.



The starting point to find out how an application works is of course `index.html`. Therefore, we will look at its content now.

index.html

Make sure that the code for the Backbase area in `index.html` looks like this:

```
<script type="text/backbase+xml" style="height:100%">
   <xi:include
      href="../../backbase/4_4_1/bindings/config.xml" />
   <xi:include href="resources/bindings/squared.xml" />
   <xi:include href="app.xml" />
</script>
```


For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

In addition to the `config.xml` file that is there to include the Backbase widgets and tag libraries, we also include `resources/bindings/squared.xml` and `app.xml`. The `squared.xml` file is there to include our own custom built widgets. As you will see shortly, we used a widget that we built for this application. We will explain how to build custom widgets and how this works in Chapter 7, which is about the Tag Definition Language. For now, just copy the `resources` folder from the sample code provided with this book.

app.xml

The `app.xml` file contains the main user interface layout for the application. We have chosen to make a more complex layout than in the "Basic Layout" application because we needed space for some fifty examples. We gave each category of BTL widgets its own tab, and on each tab panel there is a layout like the one in the "Basic Layout". The code looks as follows:

```
<div xmlns="http://www.w3.org/1999/xhtml"
xmlns:b="http://www.backbase.com/2006/btl" style="height: 100%;">
   <div id="appHeader">
   <div class="appHeaderText">
      Squared Circles - BTL Examples</div>
   </div>
   <b:tabBox height="100%">
      <b:tab class="mainTab" label="Layout">
         <b:populator
            events="DOMNodeInsertedIntoDocument select"
            url="panels/layout.xml" />
      </b:tab>
      <b:tab class="mainTab" label="Info & Notify">
         <b:populator url="panels/infoNotify.xml" />
      </b:tab>
      <b:tab class="mainTab" label="Actions & Menus">
         <b:populator url="panels/actionMenu.xml" />
      </b:tab>
      <b:tab class="mainTab" label="Forms">
         <b:populator url="panels/forms.xml" />
      </b:tab>
      <b:tab class="mainTab" label="Multimedia">
         <b:populator url="panels/multimedia.xml" />
      </b:tab>
      <b:tab class="mainTab" label="Windows & Dialogs">
         <b:populator url="panels/windowsDialogs.xml" />
      </b:tab>
   </b:tabBox>
</div>
```


For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

For the `tabBox` used in our application, the tab panel contents are not coded directly, but they are loaded from another file with a `populator` element. The `populator` element differs from `XInclude` because the file is loaded in a lazy manner—only when you click on a tab to select it, are the contents loaded. In our case, the contents will be loaded once because we did not specify a `type` attribute and therefore, its default value is assumed to be `once`.

Note that for the first tab we also specified an `events` attribute, which shows a `DOMNodeInsertedIntoDocument` value, in addition to the `select` value, which is the default. This is because the `select` event is not fired when the `tabBox` is loaded for the tab that is the selected tab, by default the first one.

Tab panel content

Let's look at the content of one of the tab panels. The content of all of them is very similar. We chose the panel for the multimedia category of widgets. Here's the content of the tab panel:

```
<div xmlns="http://www.w3.org/1999/xhtml"
  xmlns:b="http://www.backbase.com/2006/btl" style="height: 100%;">
   <b:panelSet columns="200px *" splitter="true">
      <b:panel>
         <xi:include href="menus/multimediaMenu.xml" />
      </b:panel>
      <b:panel class="btl-border-left">
         <div class="examplePanel">
            <p> Flash and Applets. </p>
         </div>
      </b:panel>
   </b:panelSet>
</div>
```

Each tab panel contains its own `panelSet` to create its layout. Each `panelSet` uses a layout that is very similar to the basic layout that we described in Chapter 1.

We have chosen here to load the real content of the left part of the panel with an `XInclude`. This means that the code is loaded statically when the `tabBox` is loaded into the web application user interface. If the user interface of the application would have many tabs of which you expect only a few will be used, then you should use a `populator` element instead to load the contents more dynamically. You should also use it if the contents of each tab are very large or if the contents should be refreshed whenever the tab is selected.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

You could argue that the use of `XInclude` here is modularization taken too far, which results in too many small files. This is a matter of choice. Try to experiment whatever size of files and modules works for you to make the code more clear to read and therefore, easier to maintain. Recognize though, that you indeed have a choice without resorting to server-side inclusion of code fragments, for example, by PHP or JSP processing.

The menu in each tab panel

In the example above, you saw a reference to the menu file to be included. What does it look like? Let us take as example the `menus/infoNotifyMenu.xml` file. It contains the code that shows a menu with a set of `navBox` widgets, one for each BTL widget in the category that the tab panel represents:

```
<div xmlns="http://www.w3.org/1999/xhtml"
     xmlns:b="http://www.backbase.com/2006/btl">
   <b:navBox label="balloon" open="false">
      <sq:navLink example="btl_balloon" />
   </b:navBox>
   <b:navBox label="infoBox" open="false">
      <sq:navLink example="btl_infoBox" />
   </b:navBox>
   <b:navBox label="toolTip" open="false">
      <sq:navLink example="btl_toolTip" />
   </b:navBox>
</div>
```

We have chosen a set of `navBox` elements over an `accordion` because we wanted all `navBox` elements to be closed, whereas for an `accordion` there will always be one `accordionItem` open.

The code looks simple enough, but what does `<sq:navLink example="btl_infoBox" />` mean? Or the other `navLink` elements? Well, think about what we would like to see when you click on a `navBox` tab:

- The `navBox` should open and we would like some descriptive text to appear for each example that is available for the particular BTL widget that is in the title of the `navBox`.
- A standard text will be appended to each description: **click here to see the example...**
- When you click on the **click here** text, the example should be loaded and shown in the panel to the right of the menu area.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

The following code snippet implements this for the case when we want to look at the `infoBox` test case:

```
<div>
   <b:populator events="DOMNodeInsertedIntoDocument"
      url="../../descriptions/btl_infoBox.xml" />
   <a href="javascript:">
      click here to see the example ...
      <e:handler event="click">
         <c:load url="../../examples/btl_infoBox.xml"
            destination="following::b:panel[1]"
            mode="replaceChildren" />
      </e:handler>
   </a>
</div>
```

Our `sq:navLink` is an encapsulation into a widget that we made ourselves for the code in the snippet above. Instead of having to copy the code above fifty times, each with slightly different content, we now only have to code one line for each of the widgets. We will explain more about it in Chapter 7, which describes the Tag Definition Language.

The code in the snippet does the following:

- Load the description for the `infoBox` example underneath the `navBox` header using a `populator` widget.
- Load the code for the example itself in the `panel` on the right. The `populator` does not allow us to specify a target for the contents of the file to be loaded, therefore, we are using the more powerful `c:load` command to accomplish this. We will explain the Backbase commands including `c:load` in the next chapter.

You have already seen some of the code for the examples and their descriptions. Therefore, we assume that you already know what the files to be loaded, which are in the `descriptions` and the `examples` folders, will look like.

We can conclude that we have built with very simple means a rather extensive and dynamic application that shows the power of Backbase Tag Library.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

Summary

In this chapter, we took a closer look at the Backbase Tag Library and in particular the layout widgets.

The proper layout of an application user interface involves styling with CSS. We described how CSS can interact with the BTL widgets and how you can go about styling in your web application. We created a web application that can show all BTL examples, basically just using the BTL layout widgets.

In the next chapter, we will give more detail about the execution logic of a web application—commands and XEL.

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book

Where to buy this book

You can buy Backbase 4 RIA Development from the Packt Publishing website:
`http://www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book`

Free shipping to the US, UK, Europe and selected Asian countries. For more information, please read our shipping policy.

Alternatively, you can buy the book from Amazon, BN.com, Computer Manuals and most internet book retailers.

www.PacktPub.com

For More Information:
www.packtpub.com/backbase-4-4-x-rich-internet-applications-ria-development/book